

Electroencephalography in Children with Febrile Seizures: Is it Useful or Useless?

Eun Hye Lee* and Sajun Chung

Department of Pediatrics, College of Medicine, Kyung Hee University, Seoul, Korea

*Corresponding author: Eun Hye Lee, Department of Pediatrics, Kyung Hee University College of Medicine, 1, Hoegi-dong, Dongdaemun-gu, Seoul 130-702, Korea, Tel: 82-2-958-8295; E-mail: leeh80@khmc.or.kr

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Introduction

Febrile seizure is the most common convulsive disorder in childhood, which occurs 2-5% of children. According to American Academy of Pediatrics (AAP), it is defined as a seizure occurring in febrile children between the ages of 6 and 60 months who do not have an intracranial infection, metabolic disturbance, or history of afebrile seizures [1]. Although it is a benign condition in most cases, it is a very frightening event for the parents and they suffer extreme fear and anxiety for recurrent of seizures or development of epilepsy. Therefore, it is crucial to explain the patients about the natural history of febrile seizures, and the proper measures to cope with fever and seizure episode. To predict recurrence of febrile seizures or epilepsy, many clinicians order routine EEGs in patients with febrile seizures. However, there is no consistent evidence that abnormal EEGs are predictive of either the risk of recurrence of febrile seizures or of the development of epilepsy. AAP have stated that routine EEG is not recommended in the evaluation of a healthy child with simple febrile seizures [2]. Nevertheless, this statement did not include patients with complex febrile seizures. The utility of EEG in complex febrile seizures is still controversial [3].

Recently, several studies have addressed a prognostic value of EEG in complex febrile seizures. In a study of Kanemura et al. [4], the patients with complex febrile seizures had abnormal EEGs significantly compared than those with simple febrile seizures. Furthermore, frontal EEG paroxysm was found to be significantly associated with a higher risk for development of epilepsy than paroxysm in other regions of EEG foci. In the following year, Kim et al. [5] evaluated clinical and EEG risk factors for development of epilepsy in 183 patients with complex febrile seizures. Regarding to EEGs, focal epileptiform discharges were identified as a risk factor for subsequent epilepsy. They found that subsequent epilepsy was developed 50% in patients with focal epileptiform discharges compared to 13% in those without focal epileptiform discharges, with an odds ratio of 5.15 (95% confidence interval, 1.84–14.5). They also reported the higher risk of subsequent epilepsy in patients with focal epileptiform discharges and prolonged or multiple seizures. The

significance of regions of EEG abnormalities was not evaluated in the cited study. Most recently, Gradisnik et al. [6]. Reported focal EEG abnormalities combined with clinically focal seizures as a predictive factor of subsequent epilepsy in patients with febrile seizures.

Those studies suggest similar conclusions, that the presence of epileptiform discharges is significant risk factor for subsequent epilepsy in patients with complex febrile seizures. However, it is not sufficient to draw a sound conclusion from those small sample sized studies. Cochrane Reviews have stated that there is no evidence to support or refute the use of EEG and its timing after complex febrile seizures in children [7].

In conclusion, unlikely to cases with simple febrile seizures, there are several recent studies that showing some predictive value of EEGs in complex febrile seizures. It has to be clarified through further RCTs in the future. For clinicians, we suggest that attention should be paid the patients with complex febrile seizures with focal EEG abnormalities for development of epilepsy with serial EEG evaluation.

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